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BULLETIN
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New and rare African mosses, from Mitten's herbarium and
other sources

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(WITH PLATE I)

It is eminently desirable—if for purposes of reference only—in short and scattered bryological papers, especially where new species are described, to deal separately with separate geographical areas, or at least only with such as can be described in the title of the paper. The practice of some authors, of describing in a paper purporting to deal with one geographical region, single species from quite another part of the globe is, I think, a very unfortunate one, and liable to lead easily to subsequent error. The description in the present paper of new species from as widely diverse localities as Cape Town, Kilimanjaro and Mauritius, is not, I believe, a violation of the above canon. For it is more than ordinarily difficult to draw a line of demarcation between the floristic regions of South and Central Africa. It is an established fact with phanerogams: "One of the most marked facts connected with the flora of this continent is the wide range both in latitude and longitude of many of its species. No less than one fifth of the tropical species are common to east and west; while the range of the trumpet- or pig-lily, from Cape Town to the first cataract of the Nile, is the botanical parallel of the wide latitudinal range of the hippopotamus."*

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* See Boulger, *Plant Geography* 108. 1912.

This view is amply borne out by the facts of bryological distribution, so far as they have been studied, and is accentuated by some of the records which will be found below. For example, several of Mr. Wager's Transvaal gatherings here referred to are identical with species hitherto known only from the equatorial regions; a further example is that of *Microthamnium saprodelphum* from Mauritius, hitherto known only from a single station in the Cameroons; while *Rigodium dentatum* from Pretoria has at present only one African congener, and that a native of the equatorial zone. The more or less continuous, elevated forest belt connecting these regions, and the absence of any very pronounced geographical barrier, either mountain range, water, or desert, may perhaps help to account for this. The bryological flora of Southeast Africa, especially between the fifth and twenty-fifth parallels of south latitude, is, however, almost unknown, and promises an interesting field of discovery.

The facts above referred to render the description of "geographical species" even more dangerous than in other parts of the world. In describing new species from the Cameroons, for example, it is quite natural to give little heed to species only known from Abyssinia or from Cape Colony, whereas an identity is by no means improbable; and I have no doubt that a comprehensive knowledge of African bryology would lead to a considerable reduction in such species. On the other hand the relationships of African mosses—at least from the equator southwards—with those of other continental areas are much less close than those which obtain in the case of most of the continents, *e.g.*, Europe and North America, Europe and North Africa, Oriental Asia and North America, Australasia and South America; and the number of specific forms common to these parts of Africa and other geographical areas appears to be very small.

LEUCOLOMA HOLSTII Broth.

Kilimanjaro, *Bishop Hannington*, Mitten's herbarium.

A small, slender plant, which agrees exactly with an original specimen of Holst's at Kew, determined by Brotherus, from Usambara, except that the leaves are not markedly secund there, as they are in Hannington's plant.

Campylopus (EU-CAMPYLOPUS § TRICHOPHYLLI) angolensis

Machado & Dixon, sp. nov.

Sat robustus; caules circa 4 cm. alti, interdum furcati, *densifolii*, superne *olivacei*, infra fusci, per totam fere longitudinem dense rufo-tomentosi, haud intertexti, facile separabiles. Folia valde conferta, sicca suberecta, madida patentia, 5–7 mm. longa, 0.75–1 mm. lata, e basi oblonga *parum concava* cito angustata, marginibus superioribus convolutis, *serrulatis*; inferiora *in pilum breve fuscum subintegrum* desinentia, superiora *pilo longo flexuoso flavido denticulato* aristata. Costa infra $\frac{2}{5}$ – $\frac{3}{5}$ folii latitudinem occupans, *optime limitata*; sectione eae *C. flexuosi* Brid. sat similis. Areolatio superior breviter rhomboidea, cellulae supra-alares latae, rectangulares, marginem versus minime angustatae, alares magnae, rubellae, auriculas inflatas pernotatas instructas.

Flores aggregati, comosi; setae aggregatae; theca leniter asymmetrica, basi parum strumosa; calyptra *fimbriata*.

HABITAT: Gambos, Angola, on the ground at 1,250 m. alt., April, 1915, *Juliano de Carvalho*, communicated by Dr. Ant. Machado.

I do not know any species from Central or South Africa nearly resembling this; nearly all the Angola species as well as those from British East Africa have a very wide nerve. In the present plant the leaf base is almost exactly identical with that of *C. flexuosus* Brid., as is also the nerve section and areolation generally; the hair-point, which at once distinguishes it from that species, is notable in not being hyaline, but yellowish or, in the older leaves, brown, similarly to what obtains in some forms of *C. introflexus* (Hedw.) Mitt., from which however the plant is entirely distinct. *C. æthiops* Welw. & Dub. differs in the black color, entire leaf margin, etc.

FISSIDENS SUBOBTUSATUS C. Müll.

Pretoria, Transvaal, *H. A. Wager*.

This agrees exactly with the description by C. Müller of Wilms's plant (Transvaal, *L. Chriss*). Wilms's specimens were, however, sterile, while Wager's are fruiting, with mature, deoperculate fruit. The terminal seta is short, 1.5–2.5 mm. in length; while the capsule is erect, quite symmetrical, and constricted below the mouth when dry, so as to be markedly urceolate.

DIDYMODON AFER (C. Müll.) Broth.

Trichostomum afrum C. Müll. Hedwigia 38: 98. 1899.

Near Pretoria, Transvaal, *H. A. Wager* 66b.

This agrees with a specimen, "Transvaal, coll. Wilms, 2475," in the Kew Herbarium. It was mixed with another species of *Didymodon* (*Hydrogonium*), which may be a form of *Trichostomum afro-fontanum* Rehm., but is rather widely different from Rehmann's specimen.

Tortula Eubryum (C. Müll.) Dixon, comb. nov.

Barbula Eubryum C. Müll. Flora 62: 379. 1879.

Hilly rocks, Pretoria, Transvaal, *H. A. Wager* 15; Barberton, Transvaal, *H. A. Wager* 280.

A very marked and distinct species, which I have no hesitation in referring to *Barbula Eubryum* C. Müll., from Central East Africa (Ukamba, Kitui, *Hildebrandt*, 1877). It is very distinct in the habit, the long, highly undulate, acute leaves with strongly recurved margin, the nerve strongly prominent at back, and shining when dry, excurrent in a short robust mucro or cusp, and in the large, highly developed gemmae in terminal cups or rosettes, as in *T. pagorum* (Milde) De Not. The similarity in this respect, the habit, the lax (very fragile) basal cells, and the upper areolation, leave no doubt, I think, that the proper position of the species is in *Tortula* (*Syntrichia*). Its occurrence in such widely separated stations is a striking fact.

C. Müller described it first as the type of a new section *Bulbibarbula* of *Barbula*, on account of the gemmae which he found at the base of the apical leaves. But, as he explains,* he was not able to confirm their occurrence upon a later reëxamination of the specimen, and therefore to avoid error he subsequently placed the species under a new section *Rhystobarbula* (from the undulate leaves). Mr. Wager's specimens, showing both these characters in a very highly distinct fashion, confirm the accuracy of C. Müller's first observation. In view, however, of the occurrence of somewhat similar gemmae in *T. pagorum*, *T. laevipila* var. *laevipilaeformis* (De Not.) Limpr., etc., the last chosen name

* Gen. Musc. Frond. 463. 1901.

appears preferable to the former, if the plant be retained in a separate section, in view of the very marked and unusual transverse undulation of the leaves.

TORTULA EXESA (C. Müll.) Broth.

Zoutpansberg District, North Transvaal, *T. Jenkins*, communicated by W. Ingham.

This agrees quite well with the description of *Barbula exesa* C. Müll.* The very highly fragile leaves, of which it is hardly possible to find a perfect specimen, form the most noteworthy feature in this marked species.

TORTULA ERYTHRONEURA Schimp.

Cape of Good Hope, *S. W. Hall*, communicated by L. B. Hall.

This agrees well with "Wilms, 2580," at Kew. Whether it be anything more than a form of *T. ruralis* (L.) Ehrh. may perhaps be doubtful.

OEDIPODIUM AUSTRALE Wager & Dixon

This extremely interesting plant has been described by Wager† but a few additional remarks may be of interest. It is very close to the European species, *Oe. Griffithianum* (Dicks.) Schwaegr., but differs in the non-ciliate, mucronate leaves and smaller cells. The stems also spring from a creeping rhizomatous primary stem, which has not been observed in the northern plant. The gemmae are very remarkable, being perhaps the largest and best developed of any known species of moss. They are large (300 μ in diameter) and lenticular with a thin equatorial ring; while those of *Oe. Griffithianum* are smaller, obovate, and less regular.

The geographical distribution of the two species is also highly remarkable, *Oe. Griffithianum* being confined to a few alpine summits in Great Britain, Scandinavia, Alaska and Greenland, while the stations for *Oe. australe* are confined to low or comparatively low elevations in Natal and the Transvaal.

ANOMOBRYUM PROCERRIMUM Rehm.

Dry earth, Pretoria and Van Reenen, Transvaal, *H. A. Wager*; Estcourt, South Africa, 4,600 ft. alt., *R. C. Wroughton*, March, 1913, communicated by W. R. Sherrin.

* Hedwigia 38: 103. 1899.

† Trans. Roy. Soc. South Africa, 4:3. pl. 1.

There is a good deal of confusion about the nomenclature of this plant, which is very near the northern *A. filiforme* (Dicks.) Husn., but which may perhaps be separable on the ground of its slightly pointed leaves and less highly appendiculate cilia.

Rehmann issued his *Musci austr.-afr.* 214 as *Mielichhoferia procerrima*; this C. Müller gives as a synonym of his *Bryum promontorii*. Paris, Index, Ed. 2, under the latter name gives as a synonym *Mielichhoferia procumbens* Rehm., which is no doubt simply a slip for *procerrima*. A more serious error lies in the fact of his retaining *Bryum promontorii* C. Müll. (with *M. procerrima* Rehm. 214 as a synonym), and at the same time *Anomobryum procerrimum* Rehm. 540, giving *M. procerrima* Rehm. 219 as a synonym. This would seem to imply that Rehmann's 214 is a different species (and genus) from his 219 and 540. But Rehmann has himself cited his 214 as a synonym of his *Anomobryum procerrimum* Rehm. 540 (on the label of the latter), and there can be no ground for separating them.

Brotherus cites the plant as "*A[nomobryum] procerrimum* (C. Müll. als *Bryum*)," but this too appears to be an error. The synonymy should, I believe, stand thus:

ANOMOBRYUM PROCERRIMUM Rehm. *Musci austr.-afr.* 540; Brotherus in Engler & Prantl, *Nat. Pflanzenfam.* 1³: 563.

November, 1903*

Mielichhoferia procerrima Rehm. *Musci austr.-afr.* 214, 219.

Bryum procerrimum Par. Ind. 206. 1894.

Bryum promontorii C. Müll. *Hedwigia* 38: 69. 1899.

***Bryum* (EUBRYUM § ROSULATA) *canariensisforme* Dixon, sp. nov.**

B. canariensi Brid. peraffine; differt statura paullo graciliore, foliis perconcavis, marginibus *erectis nec recurvis*, apicibus *brevius mucronatis*, thecae operculo *breviter conico, subobtusulo*. Inflorescentia autoica? [FIG. 1.]

HABITAT: Cape of Good Hope, July 25, 1900, *C. H. Hobkirk* 928, communicated by G. Webster. A specimen in the British Museum collection, labelled, "*Bry. canariense* Schpr. Synops. Süd-Africa", in Breutel's hand, also belongs here.

* *A. procerrimum* Par. (Ind. Ed. 2, 1: 52) dates from December, 1903.

The differences from *B. canariense* and *B. provinciale* Philib. if not numerous are marked, and, I believe, constant. In these the leaf-margin is distinctly recurved, often all round, the nerve excurrent in a longish cuspidate point; the capsule lid is sharply acuminate, at times almost rostellate; here it is much lower and scarcely acute. *B. polytrichoides* C. Müll. is described as having the leaves with recurved margins, obsoletely denticulate (here they are sharply toothed above), with the nerve longly excurrent. The nerve in the present species is excurrent in a very short, rather stout, often recurved mucronate point, entire or frequently denticulate.

I have found a terminal male inflorescence on a fruiting stem, but it is possible this may not be the only position in which the antheridia occur, in view of the allied *B. provinciale*.

POGONATUM SIMENSE (B. S. G.) Jaeg.

Van Reenen, Transvaal, 1914, *H. A. Wager* 52.

Another interesting extension of range, the species being hitherto known only from Abyssinia and the Cameroons. It agrees well with Schimper's and Mitten's specimens at Kew. Bruch and Schimper describe the inflorescence as hermaphrodite. It appears to me rather paroicous than synoicous, the antheridia being apparently below the innermost perichaetial bracts.

All the specimens show an occasional very faint rib on the capsule, which leads to a mild plication when dry and empty.

ERPODIUM HANNINGTONII Mitt.

Trees, Kaapmuiden, near Barberton, Transvaal, 1910, *H. A. Wager* 258.

Mrs. Britton has kindly sent me a part of Mitten's type, so that I have been able to establish the identity of Wager's plant with the Lake Nyanza species. It is not recorded from any intermediate station, but I have a strong suspicion that *E. Menyhardtii* C. Müll. from the Zambesi will prove to be the same thing, and if so the geographical gap between the two would be materially bridged over. I have not seen *E. Joannis-Meyeri* C. Müll. from Kilimanjaro; Brotherus, who had specimens of both under his eye, I believe, keeps them separate, and one must suppose that

there are some differences. It may be pointed out, however, that C. Müller himself (who had not seen Mitten's plant) describes his species as, "e descr. *E. Hanningtonii* proximum, sed icone ejusdem valde remotum, multo robustius." Now the leaves of *E. Hanningtonii* are, as given by Mitten, 1.5 mm. long, including the hair-point, whereas the drawing by Brotherus of the leaf of *E. Joannis-Meyeri* represents it as almost exactly 1 mm. in actual length. It is difficult to see, therefore, how Müller's plant can be "multo robustius" as described by the author. Probably Mitten's drawing is at fault, for his figure of the species, "natural size",* certainly does not represent a plant with leaves 1.5 mm. long. The difference in size, therefore, the only distinction suggested by C. Müller between the species, falls to the ground.

A further species from Barberton, Transvaal, which is being published by Mr. Wager, throws additional light on the distribution of this interesting genus. Its affinity is with *E. grossirete* C. Müll., from the Zambesi, having large, widely obtuse leaves with lax, smooth areolation, but it presents some differences from that species as described by C. Müller, and must therefore be considered distinct; the only other closely allied species is *E. madagasum* Par. & Ren.

BRAUNIA ELLIOTII† Broth.

Kikuyu, British East Africa, 1910, *A. Allan*, communicated by W. Ingham, *c. fr.*

This agrees quite well with the sterile plant, labelled, "Shire Highlands, December, 1893, *Scott Elliot*." The fruit has not yet been described. The perichaetium is long, 2-3 mm., the inner bracts erect, short-pointed, seta about 1 cm. long, capsule cylindrical, about 2 mm. long, with a distinct neck, pachydermatous, narrowed at mouth and also slightly constricted below the orifice when dry and empty, somewhat plicate when quite old; lid with a longer or shorter slightly curved rostrate beak; calyptra large, castaneous, cucullate. The branches show a great diversity, a few often, and at times the greater number, being flagelliform.

* Jour. Linn. Soc. Bot. 22: pl. 16, f. 4.

† This is the correct spelling, not *Elliotii* as originally published.

LEUCODON DRACAENAE Vent.

Solai, Mt. Kenya, British East Africa, 1910, *R. Kemp*, communicated by W. R. Sherrin.

This agrees quite well with the specimen (Dendera, Abyssinia, 1862) in the Schimper herbarium, determined by E. S. Salmon as *L. Dracaenae*.

PILOTRICHELLA CONFERTA Ren. & Card.

Barberton, Transvaal, January, 1914, *H. A. Wager* 257.

This agrees quite well with the description of the above species (from Lessonto, South Africa); the only difference I can find being a minor one, viz., that the alar cells which there are described as "plus minus incrassatis et granulatis" are here rather pellucid. It is a distinct species, the short, subdendroid, rather robust and rigid branching being very different from that of most of the African species of the genus.

Thamnium capense Broth. & Dixon, sp. nov.

Caulis *pertenuis*, *flexilis*, elongatus, vage subpinnatim vel bipinnatim ramosus; atroviridis, vix nitidus; rami ramulique complanati, breves, *obtus*i. Folia ramea 2 mm. longa, late ovato-oblonga, superne angustata late acuta, ramulina multo minora, angustiora; omnia concavo-carinata, sicca paullo plicata, marginibus planis, e basi denticulatis, supra grosse regulariter dentatis. Costa valida, subsinuosa, infra summum apicem evanida, dorso prominens, *supra spinuloso-dentata*. Cellulae superiores *pellucidae*, hexagonae, angulatae, 8–12 μ latae, parietibus firmis, *nec incrassatis*, marginem versus majores, elongatae, infra sensim longiores, hexagono-rectangulares, ad infimam basin elongatae, flavidae, parietibus incrassatis. Cetera nulla. [FIG. 2.]

HABITAT: in packing from Cape Town, 710, communicated by G. Webster.

This species belongs to the small group with the nerve dentate at back above, to which belong the northern *Th. alopecurum* (L.) B. S. G., and *Th. Leibergeri* E. G. Britton. The former differs in the more robust, dendroid habit, and smaller, denser, more incrassate cells; the latter in the more rigid habit, more obtusely pointed leaves, and larger cells. *Th. maderense* Kindb. is described as a much larger plant, with the growth of *Th. alopecurum*, the cells rhomboid-oval, the leaves "pauci-dentata," etc. The author

describes the nerve as smooth, but Brotherus places the species in the section with nerve toothed at back.

The habit of the species is unusual, the stems being filiform, flexuose and not at all dendroid, but it is quite probable that the scanty material may not represent the true habit altogether correctly. The leaf characters, however, are in any case distinctive.

Entodon brevirameus Dixon, sp. nov.

E. Dregeano peraffinis. Differt caule elongato, sat regulariter pinnatim ramoso, ramis *patentibus brevibus obtusis*, vix 0.5 cm. superantibus, foliis magis decurvatis; foliis perichaetialibus *squarrosis*; columella valde exserta; peristomii dentibus *ubique fere longitudinaliter, ad infimam basin tantum transverse, striolatis*, longioribus, melius evolutis, sporis *laevibus*. [FIG. 3.]

HABITAT: on stones in bed of stream, 2,000–3,000 ft. alt., Pieter Maritzburg, Natal, 1909, *H. A. Wager* 9.

The characters above detailed are, I think, sufficient to separate this plant from *E. Dregeanus* (Hornsch.) C. Müll., which however varies considerably; the perichaetial bracts are usually erect and convolute, but specimens in the national collections in London, apparently correctly named, have the perichaetial bracts squarrose. For the present, however, I am not inclined to lay much stress on this character, nor on the single seta, in view of the small quantity of material available (in *E. Dregeanus* the setae are said to be usually aggregate, but I doubt if this be correct); the habit, branching and peristome characters are, however, probably reliable and of sufficient importance even though the others should prove invalid. In *E. Dregeanus* the peristome teeth are *transversely* striolate in the lower half, they are shorter and less regular, the columella I have not found exserted, the spores are slightly papillose. The inner peristome here is very delicate and adherent to the columella.

TRACHYPHYLLUM GASTRODES (Welw. & Dub.) Gepp

Barberton, Transvaal, *H. A. Wager* 265.

Eight African species have been described of this small genus, all of them are, as Brotherus has remarked, very closely related one to the other, and I should not be surprised if several of them have ultimately to be reduced to *T. fabronioides* (C. Müll.) Gepp.

T. gastrodes however is more marked as a species than some, in the widely spreading leaves, almost at right angles to the stem when moist, very widely cordate-oval, abruptly narrowed to a short but rather fine acumen; the cells are moderately papillose, the alar very numerous, extending half-way up the leaf at the margins. It is probably only known hitherto from the original station in Angola.

STEREOPHYLLUM ODONTOCALYX (C. Müll.) Jaeg.

Trees, Barberton, Transvaal, 1914, *H. A. Wager* 261.

FABRONIA

Sect. **Gymno-ischyrodon** sect. nov.

Planta pro more robusta, dense foliosa. Folia integra; theca gymnostoma, operculo convexo, vix apiculata.

Fabronia Wageri Dixon, sp. nov.

Dioica videtur. Planta *pro more robustiuscula*, sordide viridis, vix nitida; caules elongati, dense intertexti, radiculosi, conferte subpinnatim ramosi, ramis brevibus, suberectis, hic illic ramulosis, obtusis, siccis subteretibus. Folia *conferta*, *saepe plus minus homomalla*, erecto-patentia, sicca erecta subappressa, vix concava, ovato-lanceolata, *cito breviter acute acuminata*, marginibus omnino planis, *integerrimis*, costa apud medium folium evanida; areolatio foliorum juniorum chlorophyllosa, subobscura, seniorum pellucida, e cellulis alaribus permultis, subquadratis, totam folii basin occupantibus, superioribus *rhomboideis*, circa 10 μ latis, (4-6 \times 1), parietibus firmis, angustis, marginalibus serie unica saepe inanibus, instructa.

Fructus e caulibus ramisque enati; perichaetia cylindrica, pallida, foliis, infimis exceptis, truncatis, grosse irregulariter erose dentatis, omnibus pellucidis; vaginula archegoniis paucis praedita. Seta circa 1 cm. alta, pro more *crassiuscula*, pallide rubra, curvata; theca e collo brevi turgide ovalis, 1.5 mm. longa, operculo *convexo*, *vix apiculato*, *sicco tantum nonnunquam inconspicue mamillato*. Peristomium *nullum*. Spori parvi, 10-15 μ lati; exothecii cellulae plerumque isodiametricae, parietibus incrassatis valde sinuosius flavidis, apud orificium 5-7 seriebus multo minoribus, valde compressis, transverse rectangularibus, parietibus incrassatis, firmis, rubris. Annulus inconspicuus, persistens. [FIG. 4.]

HABITAT: in Cape Town, on trees, 1910, *H. A. Wager* 5.

This distinct species seems best placed in a new section, characterized by the somewhat robust habit, entire leaves, gymnostomous capsules with plano-convex, scarcely apiculate lid. It is very near the species of the section *Pseudo-ischyrodon* Broth., but they have a peristome and an apiculate lid. *Ischyrodon leptocladus* Rehm. (Musc. austr.-afr. 633) which, I believe, is an undescribed species is very near it (though more robust and with longer pointed leaves) and may belong to this section. Although labelled "*c. fr.*" there are no capsules to be found on the specimens either at Kew or the British Museum.

I have been unable to find male flowers, though the plants are in abundant fruit, and I think it is certainly dioicous.

LINDBERGIA

The genus *Lindbergia* Kindb. (*Fabroleskea* Best), founded on *Pterogonium brachypterum* Mitt., has been extended by Brotherus to include some half dozen other species, mostly formerly placed in *Leskea*, one (*L. Austini* [Sull.] Broth.) being from North America, two from China, one from the Himalayas, and one from Abyssinia. The genus is almost or entirely based on peristome characters, the processes of the inner peristome being wanting, and the endostome reduced to a very low basal membrane; the outer teeth are usually also densely papillose, with rather weak lamellae, and the spores are large.

The only African species hitherto known is *L. abbreviata* (Schimp.) Broth. (*Leskea abbreviata* Schimp.). It is interesting therefore to find two distinct new species in South Africa. The resemblance of the vegetative characters in the one case to *Pseudoleskea* and in the other to *Haplocladium*—both genera occurring in the same localities with them—is rather remarkable, and I have based the specific names on these resemblances. The fruit, however, serves as a ready method of distinguishing them, the capsules in *Lindbergia* being erect and symmetrical, whereas both in *Pseudoleskea* and *Haplocladium* they are inclined, somewhat asymmetrical and curved, with a much better developed inner peristome.

Lindbergia pseudoleskeoides Dixon, sp. nov.

Autoica; gracilis, repens, irregulariter ramosa, ramis inaequalibus subobtusis, *siccitate teretibus, curvatis*. Folia caulina laxiuscula, *ramea dense conferta*, madida patentia, sicca erecta appressa, late triangulari-ovata, *breviter late acuminata*, acuta vel subobtusata, paullo concava, marginibus planis integerrimis, costa sat valida, infra apicem evanida. Cellulae *rotundo-ovales*, irregulares, parietibus sat incrassatis, *omnino fere laeves, subopacae*; alares transverse elongatae, compressae, permultae, totam basin implentes.

Folia perichaetialia externa brevia, lata, subobtusata, raptim brevipungentia, interna multo longiora, erecta, convoluta, *breviter rigide acuminata*, omnia e cellulis elongatis, linearibus, laevissimis, flavo-viridibus instructa. Seta circa 1 cm. alta, pallide rubra, theca erecta, *cylindrica*, pallida, *leptodermata*, operculo *conico, obtuso*. Peristomium (imperfectum) tenue, flavidum; dentes externi dense papilloso, linea media atque articulationes pertenuis inconspicuae; peristomii interni membrana brevis, dense papillosa. Spori 22–23 μ . [FIG. 5.]

HABITAT: Buluwayo, South Africa, April 22, 1900, *E. Sadler 3171*, communicated by G. Webster.

Leskea abbreviata Schimp. in all its forms has the leaves with longer points, reflexed when dry, so that the branches are less julaceous; the branches also are not or very rarely curved when dry, the capsule wider, ovate-cylindric, darker and of stouter texture, the lid conico-rostellate. The following species is quite distinct in habit and leaf-form.

In habit and leaf-structure the present plant is almost exactly like some species of *Pseudoleskea*, and without fruit its generic position would be very difficult to determine. The peristomes in the material examined are old and the teeth broken, so that the lower part only could be examined.

Lindbergia haplocladioides Dixon, sp. nov.

Autoica. Olivacea vel aurantiaca, gracilis; caulis vage repens, ramis distantibus, *elongatis, tenuibus, subrigidis*. Folia madida patentia, sicca nonnunquam erecto-appressa, *saepissime autem apice plus minusve fortiter recurvo*; e basi ovata *sensim longe anguste acuminata*, acuta, integerrima; costa *tenuis*, in summo acumine soluta. Cellulae superiores *rhomboideae, elongatae, incrassatae*, in acumine multo angustiores, longiores, alares multae, transverse elongatae, compressae; omnes *laevissimae*.

Perichaetium ei praecedentis sat simile, paullo longius, foliis internis *longius argutius acuminatis*; seta rubra, paullo longior, theca rufescens. Operculum haud visum. Peristomium paullo saturatius flavidum, ceterum simile. Spori paullo minores. [FIG. 6.]

HABITAT: Rydal Mount, Pretoria, South Africa, 1914, *H. A. Wager* 29.

Entirely different in habit, color, leaf-form and areolation from the last; in these respects closely resembling certain species of *Haplocladium*, though differing in the quite smooth cells. The sporophytic characters are almost those of *L. pseudoleskeoides*; the general color only being a little deeper in all the parts.

HAPLOCLADIUM ANGUSTIFOLIUM (Hampe & C. Müll.) Broth.

Macomo's Hoek, South Africa, 1897, *Mrs. Clarke Williams*, communicated by Rev. C. H. Binstead; near Pretoria (on dry earth) and at Van Reenen, Transvaal, *H. A. Wager*.

These plants agree in leaf characters with the specimens in Hampe's herbarium; they manifest some considerable degree of variability, especially in habit and branching, but I believe they all belong to one type, which like its congener, *H. capillatum* (Mitt.) Broth. in southern and eastern Asia, is somewhat polymorphous. I believe that *H. afro-capillatum* Broth. and *H. amplexicaule* (C. Müll.) Broth. are likely to prove forms of the same thing.

PSEUDOLESKEA DISPERSA C. Müll.

Kilimanjaro, *Bishop Hannington*, Mitten's herbarium; Solai, Mt. Kenya, 1911, *R. Kemp*, communicated by W. R. Sherrin.

Although I have not seen *P. dispersa* C. Müll., I have no hesitation in referring the above plant to it, from the description given by Brotherus.* The plants of the Cameroons were entirely sterile, and Mitten's specimen is an unnamed, sterile scrap. Kemp's, on the other hand, is in good condition and fruiting, though the capsules are old and deoperculate, with only fragments of peristome showing. The sporophytic characters may be described, so far as shown, as follows:

* Bot. Jahrb. 24: 282. 1897.

Perichaetium praelongum, 5–6 mm. altum, *nitidum*, *foliis profunde plicatis*, longe acuminatis, integris vel tenerrime denticulatis, tenui-nervibus. Seta 2–2.5 cm. longa, rubra, theca circa 3 mm. longa, curvata, asymmetrica, rufo-fusca. Peristomii dentes externi remotiusculi, lanceolati, opaci, transverse striolati, alte trabeculati; endostomii membrana altiuscula, papillosa; processus? Cetera ignota.

Kemp's gathering shows a handsome plant, the young branches bright green, the older part orange-brown. The widely cordate, deeply plicate leaves, intermixed with a dense growth of paraphyllia, give the stems quite a thuidioid appearance. The perichaetia are longer than in any other species with which I am acquainted, and the plant is altogether more robust than any of the species I have seen except *P. denudata* Kindb.

***Drepanocladus Hallii* Broth. & Dixon, sp. nov.**

Caules erecti, 4–5 cm. alti, infra dense intertexti, caespites *compactos*, flavo-virides, *interne pallidos* formantes, *subrigidi*, laxe subpinnatim ramosi, ramis paucis, brevibus, circa .5 cm. longis, substrictis; caulium apices paullo incurvati, vix hamati.

Folia caulina sat dense conferta, homomallo-falcata, *parva*, circa 1 mm. longa, e basi ovata vix decurrente *breviter late oblique* acuminata, concaviuscula, *obtusa vel subacuta*, integra; costa tenuiuscula, male definita, circa $\frac{2}{3}$ folii attingens. Areolatio superior *densa, opaca*, e cellulis breviusculis incrassatis angustissime linearibus subvermicularibus instructa; cellulis inferioribus sensim laxioribus, basin versus lineari—rhomboideis; alaribus *permultis*, sensim angulos versus majoribus, quadratis et rectangularibus, pellucidis, omnibus subincrassatis. Folia ramea minora, angustiora, brevius acuminata, obtusa, vix falcata.

Dioica. Flores feminei tantum visi, medio caule siti, aggregati; folia perichaetialia interna patentia, caulinis similia sed echlorophyllosa. Cetera ignota. [FIG. 7.]

HABITAT: Cape of Good Hope, 1912, *S. W. Hall* 7, communicated by L. B. Hall.

The affinity of this—for a *Drepanocladus*—well-marked species, is no doubt with *D. aduncus* (Hedw.) Warnst. It is peculiar in the short wide subobtuse acumen, and the numerous enlarged alar cells, which though very conspicuous, and the extreme angular ones rather large and pellucid, do not form well delimited or at all inflated auricles.

MICROTHAMNIUM SAPROADELPHUM C. Müll.

On fallen trees, Ponce, Mauritius, September, 1862, *Dr. Ayres*, Mitten's herbarium, as *M. tenellum* Mitt.

A very slender, delicate plant, with minute, narrow leaves, and very narrow, smooth cells, which does not agree with any of the described species from South Africa or the insular regions, and appeared quite to justify Mitten in considering it a new species. On comparing it, however, with the original of *M. saproadelphum* C. Müll. (Cameroons, *Dusén 499*), I find it identical with that. Mitten's specimen is without capsules, but the setae, perichaetia, etc., are present, and in these and the vegetative characters it agrees exactly with Dusen's plant.

Plagiothecium nitens Dixon, sp. nov.

Dioicum. Caespites perlati, densi, depressi, *argenteo-virides, nitentes*. Caulis repens, sat dense ramosus, ramis complanatis, circa 2 cm. longis, plerumque attenuatis, cum foliis 3 mm. latis. Folia complanato-decurva, illis *P. Mildbraedii* Broth. persimilia, paullo angustiora, asymmetrica, apice integro vel 2-3-denticulato. Cellulae superiores anguste rhomboideae, *10-14 μ latae*.

Folia perichaetialia similia fere, sed *brevius, minus acute acuminata*. Seta *brevis*, 1-1.5 (raro 1.75) cm. longa; theca *sub-erecta vel erecta, leniter tantum curvata, cylindrica*, sicca paullo striata. [FIG. 8.]

HABITAT: Solai, Mt. Kenya, British East Africa, 1910, *R. Kemp*, communicated by W. R. Sherrin.

This plant is clearly very closely allied to *P. Mildbraedii* Broth.* from the Ruwenzori region, which I have not seen; the vegetative characters indeed seem almost or quite identical (so that I have not thought it necessary to describe them fully). The leaves in that species are figured much wider than they are in this, but the description, "ovato-lanceolata," applies quite well; on the other hand, the cells figured are very similar to those of the present plant, but they are described as "angustissime linearibus," which is not at all applicable here. The fruiting characters, however, appear to present marked differences; the perichaetial bracts are described as "*breviter subulatis*," while here the points are rather wide and scarcely acute; the seta is "2.5-3 cm. alta," or about

* *Wissensch. Ergebn. der Deutsch. Zentral-Afrika-Exped.* 2: 169. 1907-8.

twice the length of that of the present plant; the capsule is "horizontalis, asymmetrica, oblonga, laevis," while here it is erect, only very slightly curved and asymmetrical, subcylindric, and lightly plicate when dry.

VESICULARIA SPHAEROCARPA (C. Müll.) Broth.

Barberton, Transvaal, 1914, *H. A. Wager* 256, 259.

I was at first inclined to consider this plant distinct from the insular species, and I understand from Mr. Wager that Dr. Broth-erus takes the same view. I have, however, examined a fairly long series of plants of the insular *V. sphaerocarpa*, and I believe that the Transvaal plant may well come within its range. The principal points of difference that I have observed are the slightly wider cells in the present plant, and the usually more shortly pointed leaves. Montagne's specimens, however, show some degree of variation in these respects, and I have found among them some stems with equally short-pointed leaves, while the cells vary a good deal in width, and occasionally quite match those of the Transvaal plant. The leaf apex may be either entire or denticulate.

At the most I think the South African plant can only be looked upon as a slightly divergent regional race. Dr. Broth-erus, it may be noted, has recently recorded *V. sphaerocarpa* from Beni, in Central Africa.

Rigodium dentatum Dixon, sp. nov.

Pergracile. *R. gracili* Ren. & Card., et *R. kilimandscharico* Broth. habita simile; caulis primarius longe repens, secundarius erectus, *subdendroideus*, ramis ramulisque numerosis, confertis, *saepius curvatis, filiformibus, rigidis*. Folia caulis primarii subappressa, secundarii patentia, late deltoidea, *sensim longe tenui-acuminata, argute denticulata*; folia ramea minora, concavia, erecto-patentia, late ovata, anguste acuminata, *marginibus anguste reflexis*, per totam longitudinem, praecipue superne, *dense argute denticulatis*. Costa foliis caulinis *debilis, circa medium folium attingens, rameis ramulinisque pertenuis, saepe obsoleta*. Cellulae foliorum caulinorum breviter lineares, subsigmoideae, incrassatae, foliorum rameorum subsimiles, breviores, serie unica marginali multo breviores, latiores, limbum denticulatum conspicuum pulchre exhibentes; alares sat numerosae, subquadratae, obscurae. Cetera ignota. [FIG. 9.]

HABITAT: Pretoria, Transvaal, 1914, communicated by Rev. Hilderic Friend.

An interesting addition to the genus, represented in Africa hitherto solely by Brotherus's species cited above, from Kilimanjaro and Usambara. The sharp denticulation of the leaves in the present plant differentiate it from that, and the weak nerve from both that and *R. gracile* Ren. & Card.

RHYNCHOSTEGIELLA HOLSTII (Broth.) Broth.

Chaya, Congo Belge, June 16, 1911, *R. Kemp* 14, communicated by W. R. Sherrin.

This agrees with Holst's Usambara plant at Kew, except that, growing among other mosses, it is a little more lax and straggling, and darker green.

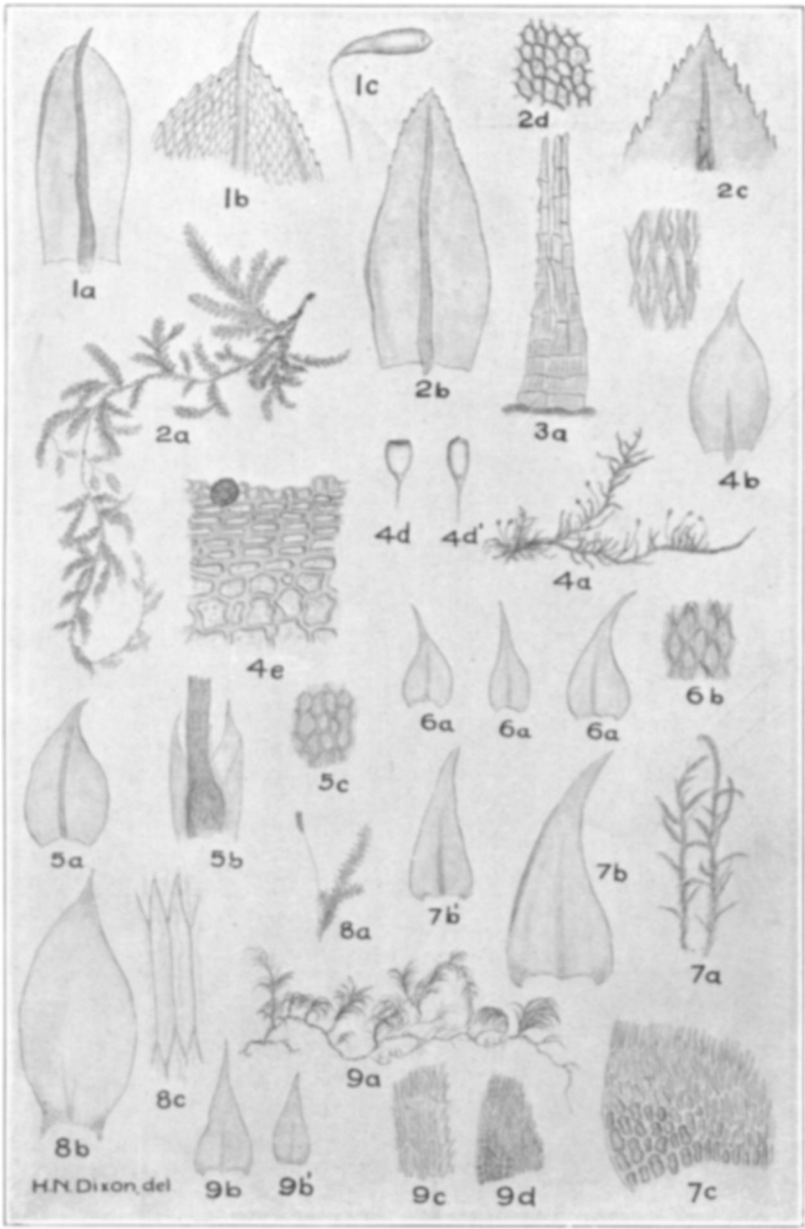
RHYNCHOSTEGIUM VOLKENSII (Broth.) Par.

Chaya, Congo Belge, June 20, 1911, *R. Kemp* 19, communicated by W. R. Sherrin.

I hesitated at first to identify this with Brotherus's plant from Marangse in the Kilimanjaro region, on account of one or two slight discrepancies between it and the original description—the numerous alar cells, which are not mentioned there, the nerve stout just at base, and then narrowed for the greater part of its length ("superne" according to Brotherus), and the capsule, which is described as "fusca, sub ore haud coarctata." The capsules here are blackish when mature, and very slightly contracted below the mouth when dry.

The British Museum specimen, however (*Volkens* 447), agrees exactly in all points with Kemp's plant; it has a single capsule, which agrees in all respects with the present specimens, in color and form, and is certainly not free from a suspicion of being slightly contracted below the mouth.

NORTHAMPTON, ENGLAND



DIXON: AFRICAN MOSSES

Explanation of plate 1

The type specimen is figured in each case.

FIG. 1. *Bryum canariensisforme* Dixon. *a*, leaf, $\times 18$. *b*, leaf apex, $\times 45$. *c*, capsule, \times about $2\frac{1}{2}$.

FIG. 2. *Thamnum capense* Broth. & Dixon. *a*, plant, about natural size. *b*, leaf, $\times 18$. *c*, leaf apex, $\times 45$. *d*, upper cells, $\times 180$.

FIG. 3. *Entodon brevirameus* Dixon. *a*, part of outer peristome, $\times 180$.

FIG. 4. *Fabronia Wageri* Dixon. *a*, stem, about natural size. *b*, leaf, $\times 18$. *c*, upper cells, $\times 180$. *d*, *d'*, capsules, $\times 4\frac{1}{2}$. *e*, exothecium cells at orifice, $\times 180$.

FIG. 5. *Lindbergia pseudoleskeoides* Dixon. *a*, leaf, $\times 18$. *b*, perichaetium, $\times 18$. *c*, upper cells, $\times 180$.

FIG. 6. *Lindbergia haplocladioides* Dixon. *a*, leaves, $\times 18$. *b*, upper cells, $\times 180$.

FIG. 7. *Drepanocladus Hallii* Broth. & Dixon. *a*, stems, about natural size. *b*, stem-leaf, $\times 18$. *b'*, branch-leaf, $\times 18$. *c*, alar cells, $\times 90$.

FIG. 8. *Plagiothecium nitens* Dixon. *a*, stem, about natural size. *b*, leaf, $\times 18$. *c*, upper cells, $\times 180$.

FIG. 9. *Rigodium dentatum* Dixon. *a*, plant, about natural size. *b*, stem-leaf, $\times 18$. *b'*, branch-leaf, $\times 18$. *c*, upper marginal cells of branch leaf, $\times 180$. *d*, alar cells of stem leaf, $\times 90$.